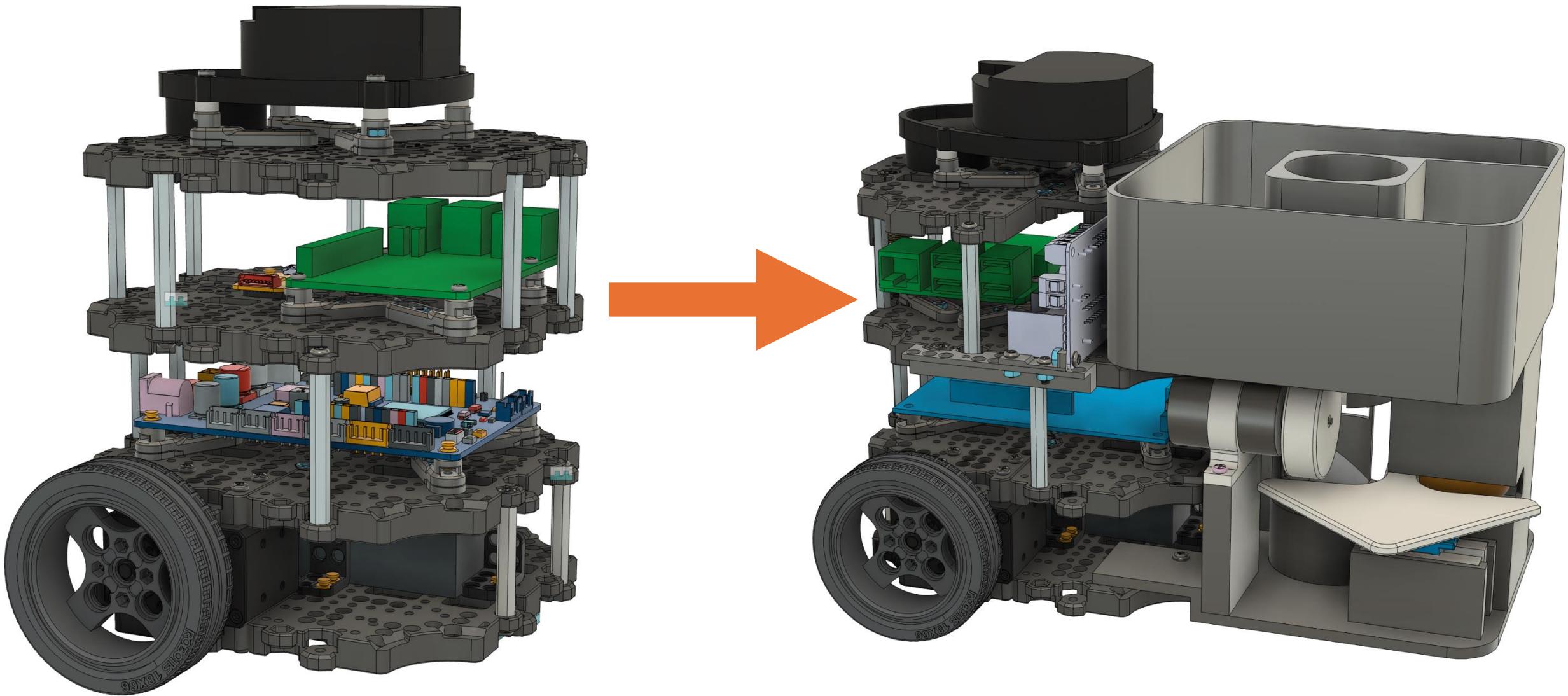
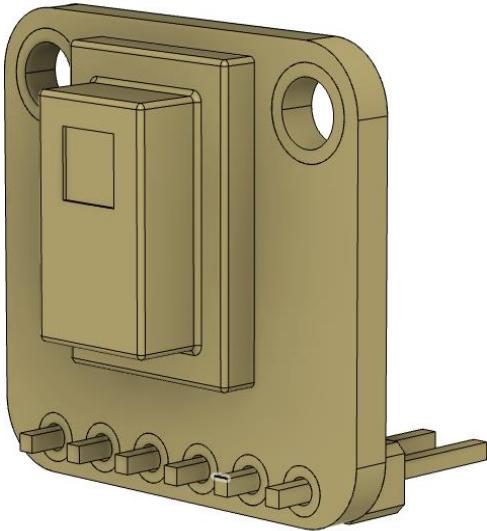


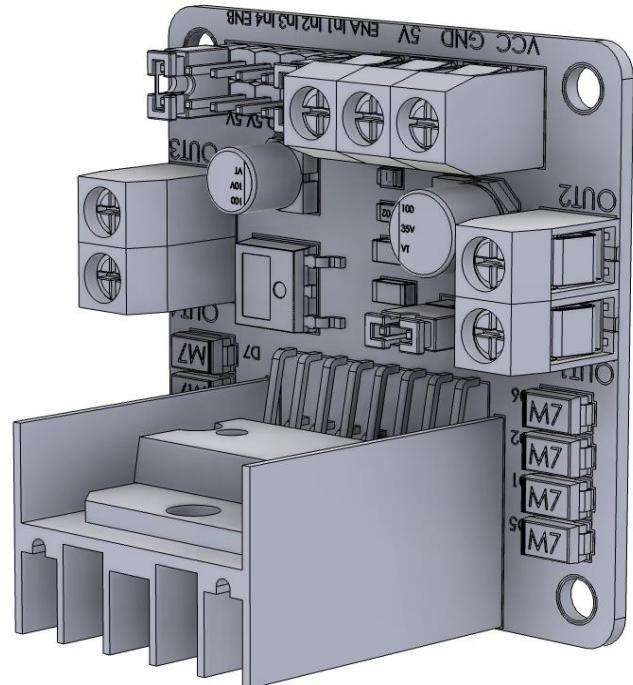
Guide to upgrade Turtlebot3 to meet mission objectives



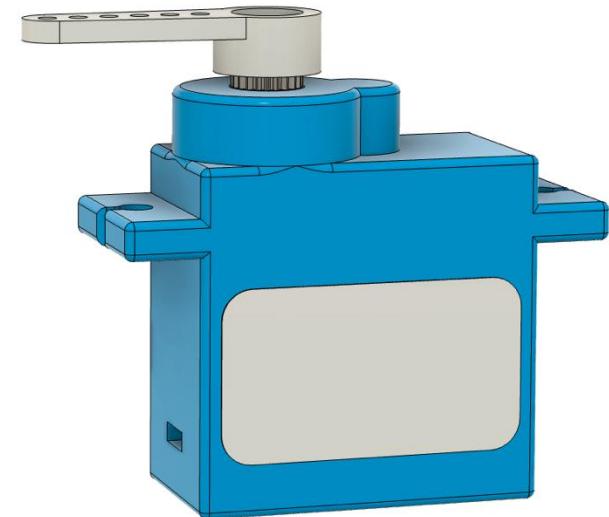
Parts to Request from Lab



AMG8833



L298N



180 Servo

Parts to Buy



12V Motor



Black Gasket Maker
(Silicone)

Fabrication

Parts to Fabricate (3D Printed)

PLA or PETG:

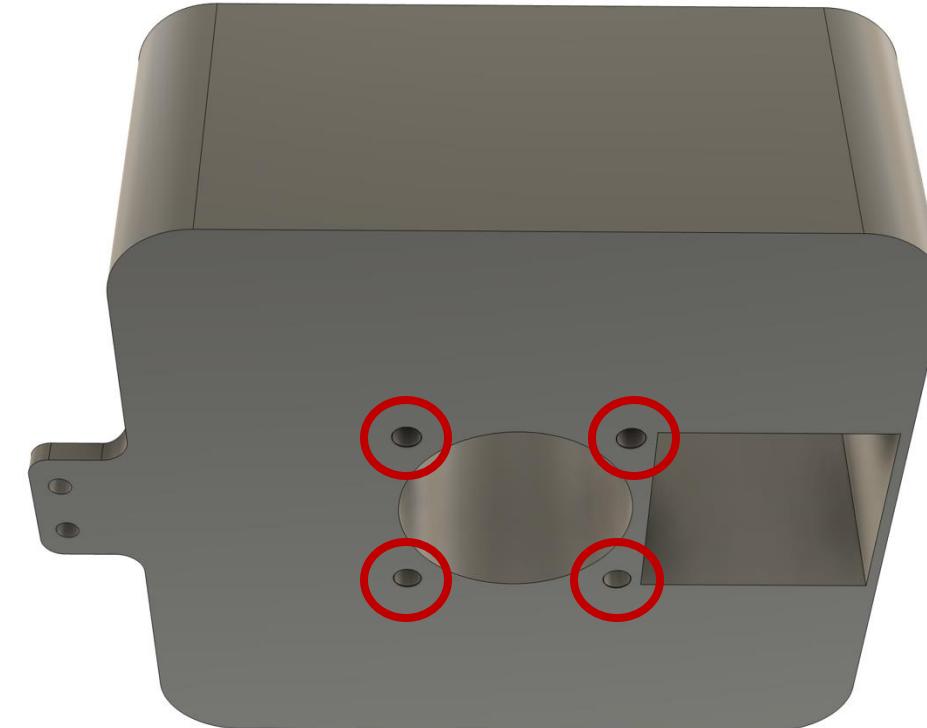
- Hopper
- Launcher Base
- AMG8833 Holder
- Modified Waffle Plate for LDS
- Modified Waffle Plate for L298N
- L298N Holder

TPU:

- Ball Feeder
- Fly Wheel x2
- Motor Holder x2
- Servo Adapter

Recommended
Material: PETG

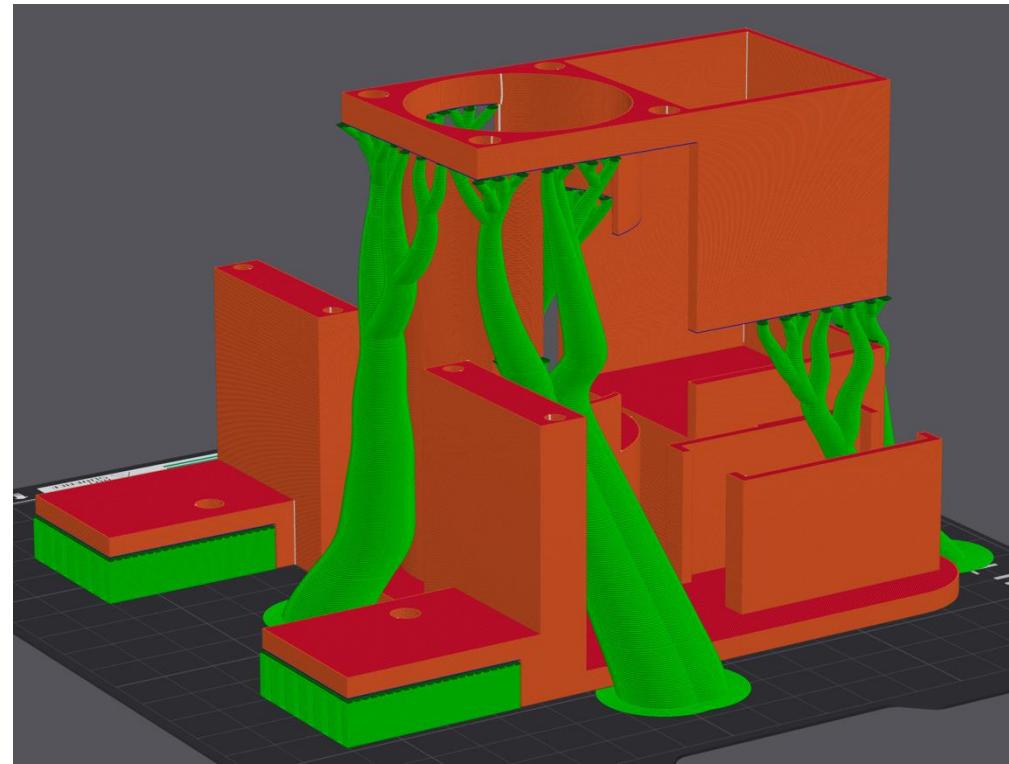
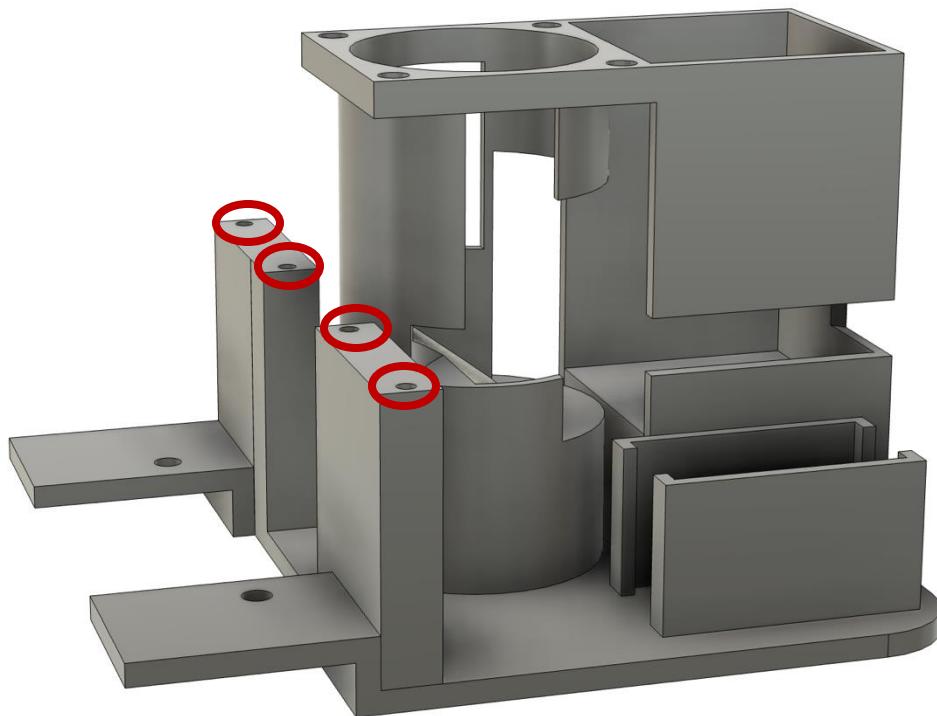
Hopper (Launcher Top Half)



M3x8x5 Heat Inserts to be
inserted into circled holes

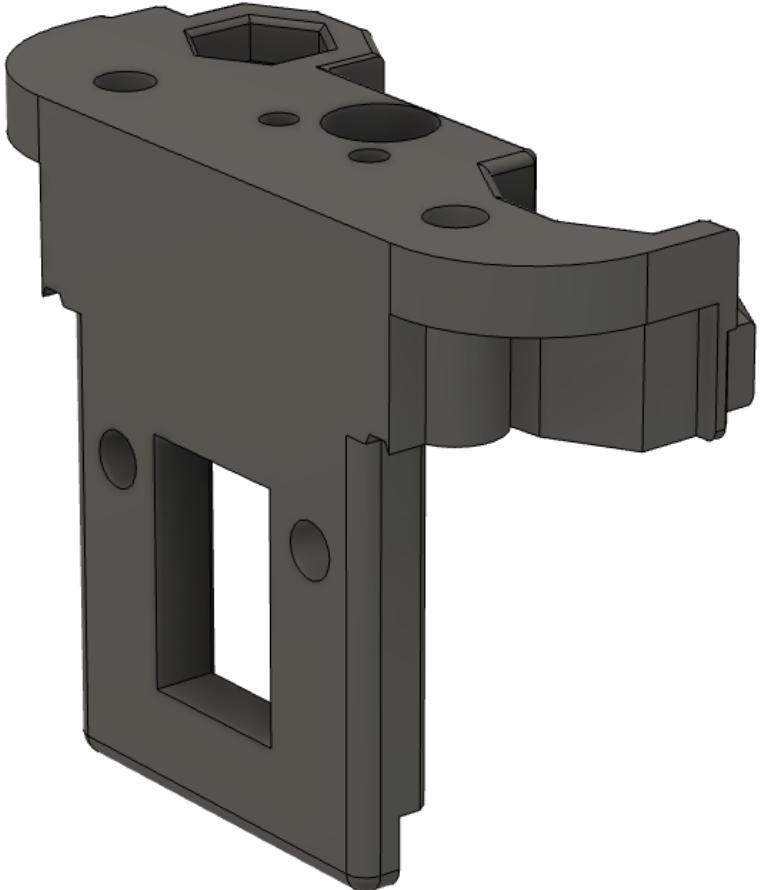
Recommended
Material: PETG

Launcher Base (Launcher Bottom Half)

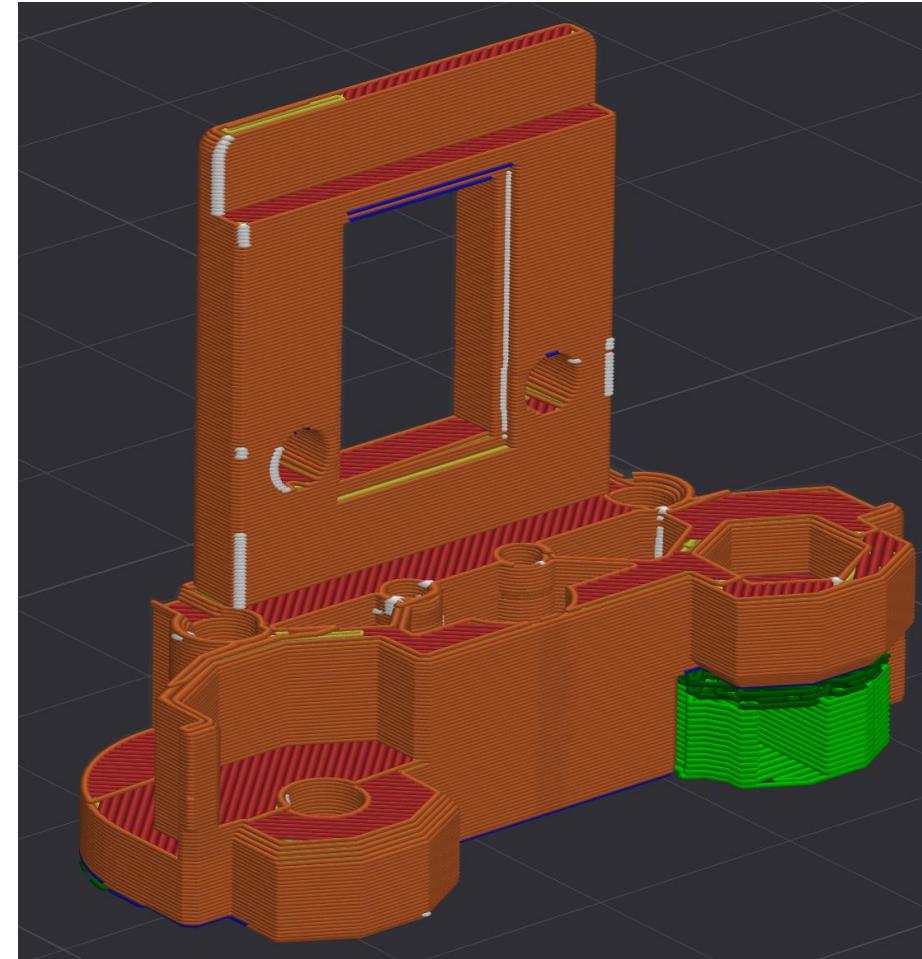


Supports required. Hybrid Tree recommended for quality and ease of removal. Heat Inserts recommended but not necessary

AMG8833 Holder



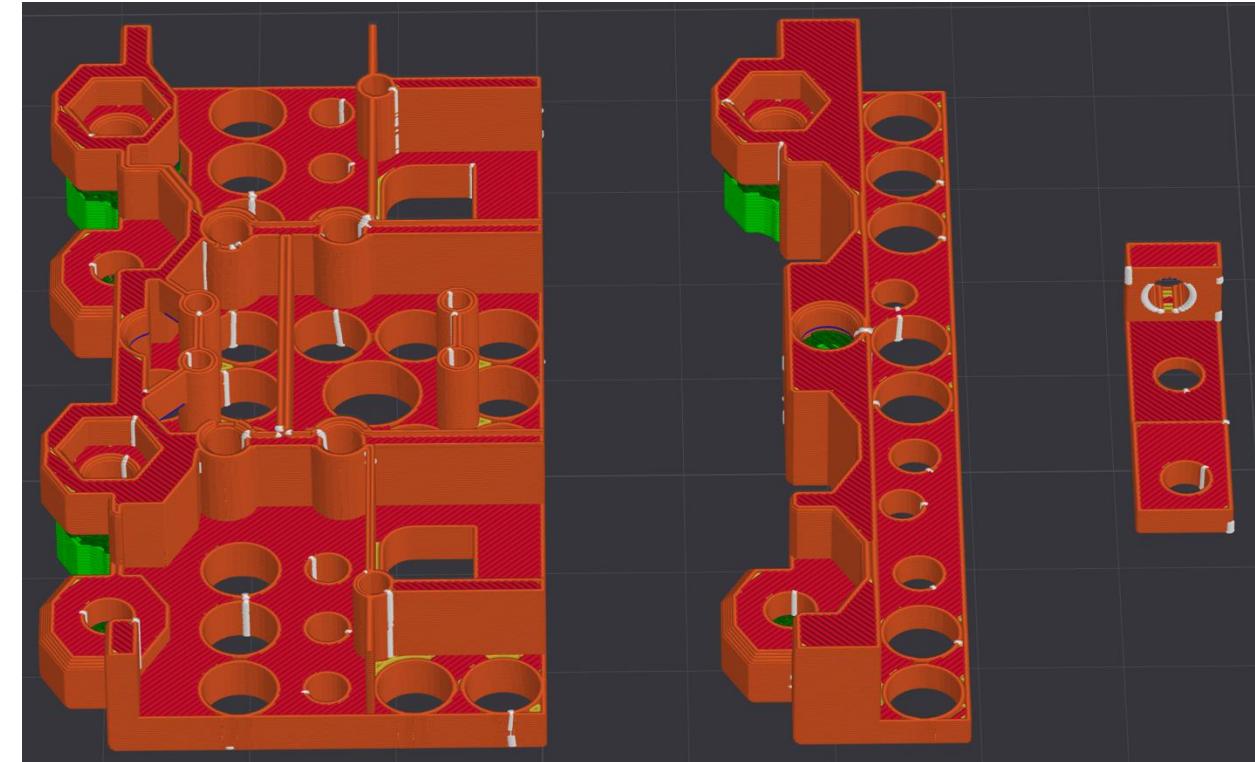
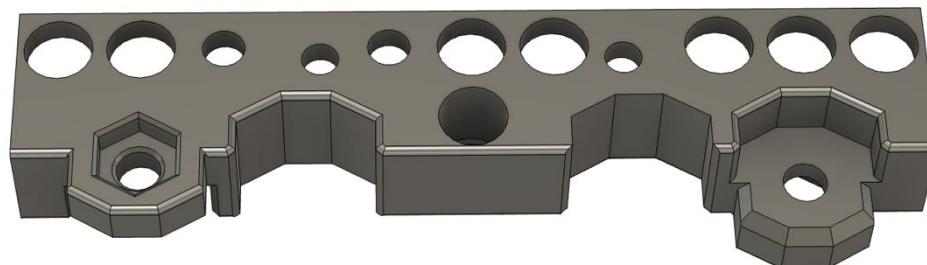
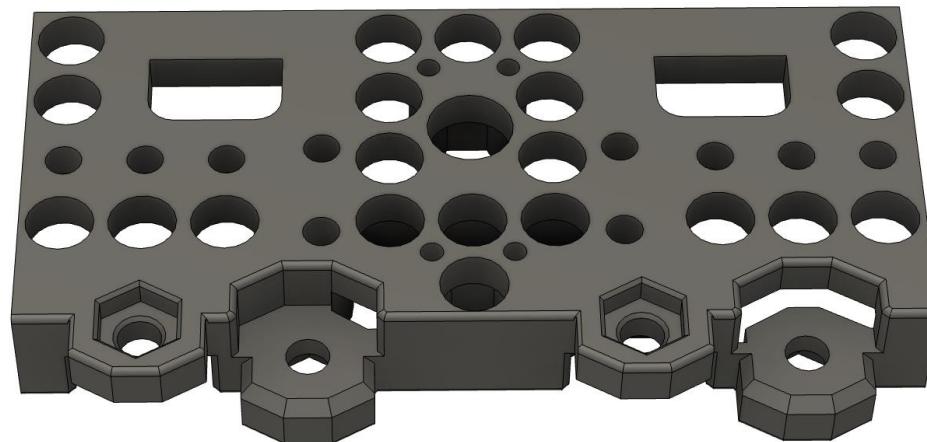
Recommended
Material: PETG



Recommended print orientation
shown above. Support for
bridge not required.

Recommended
Material: PETG

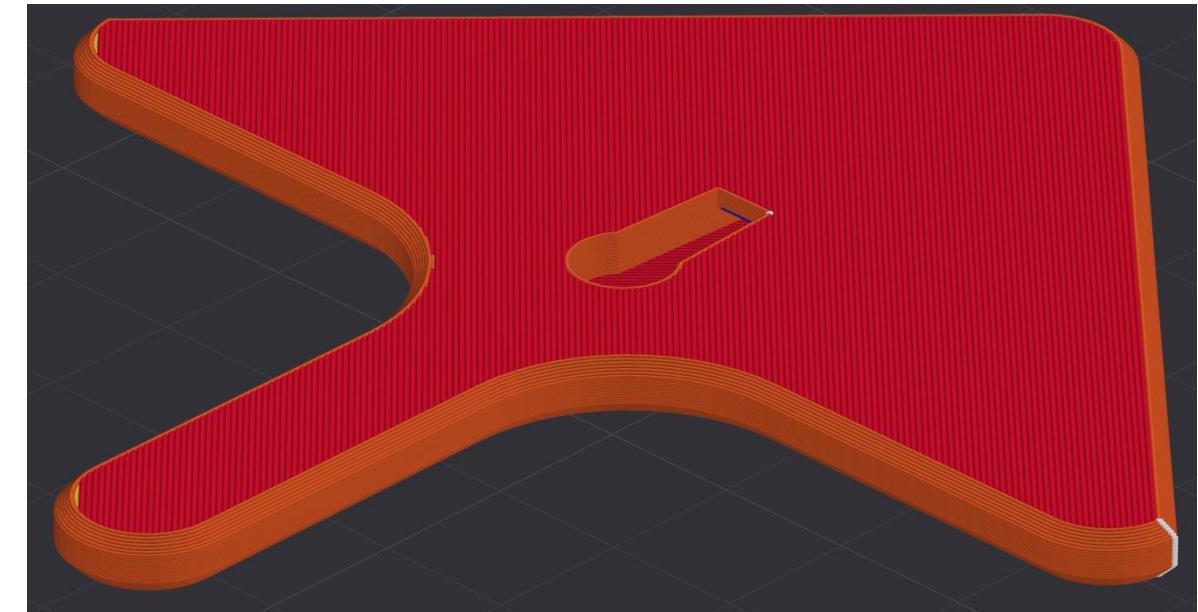
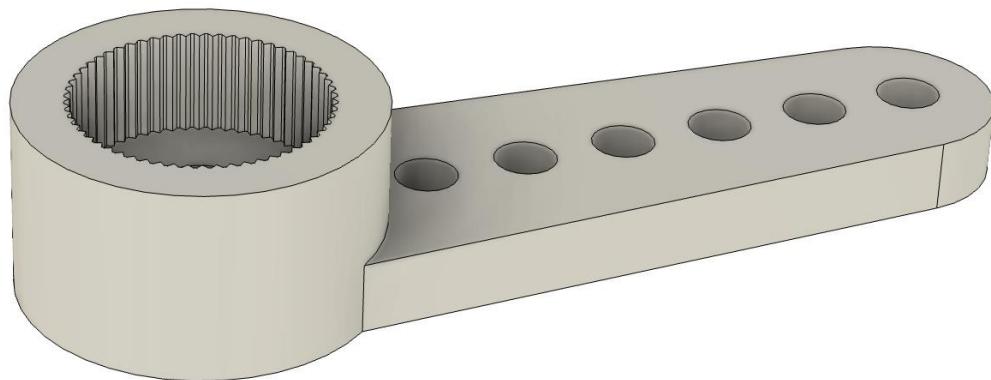
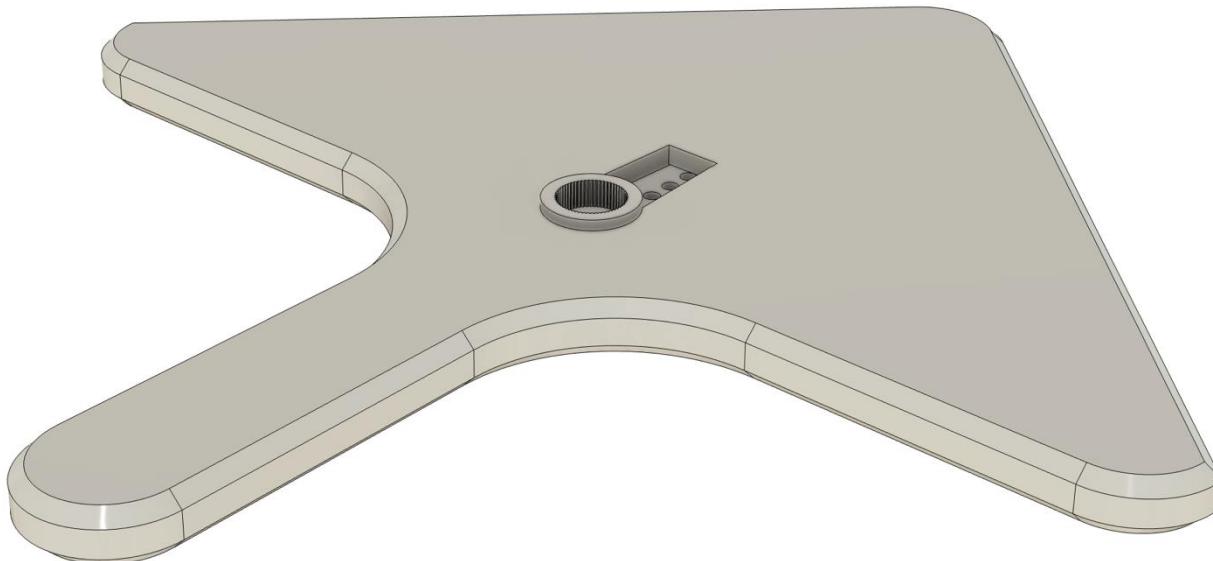
Modified Waffle Plates & L298N Holder



Recommended print
orientation shown above

Recommended
Material: TPU

Ball Feeder



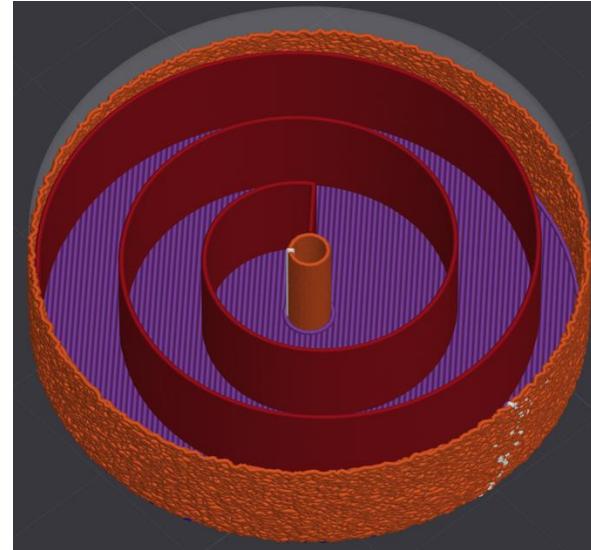
TPU makes the part bendable
allowing for the servo arm to be
installed/removed at will.

Recommended
Material: TPU

Fly Wheel x2



TPU is essential for the wheel to fit snugly on the motor shaft



Print with single wall and Archimedean Chord infill to achieve “squishy” property needed for fly wheel



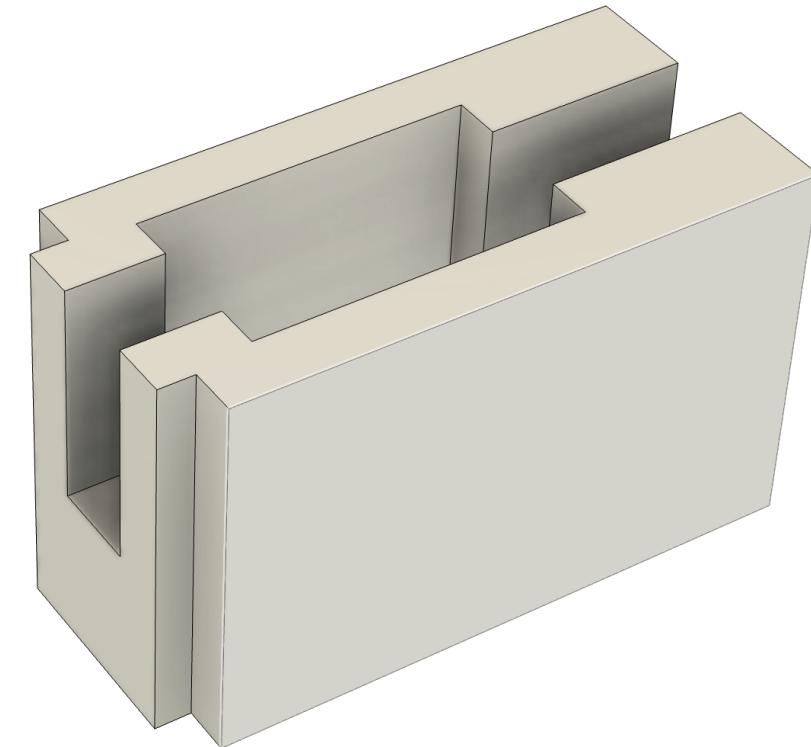
Apply at least 2 layers of black gasket to improve grip. Fuzzy skin allows the gasket to adhere better

Recommended
Material: TPU

Motor Holder x2, Servo Adapter

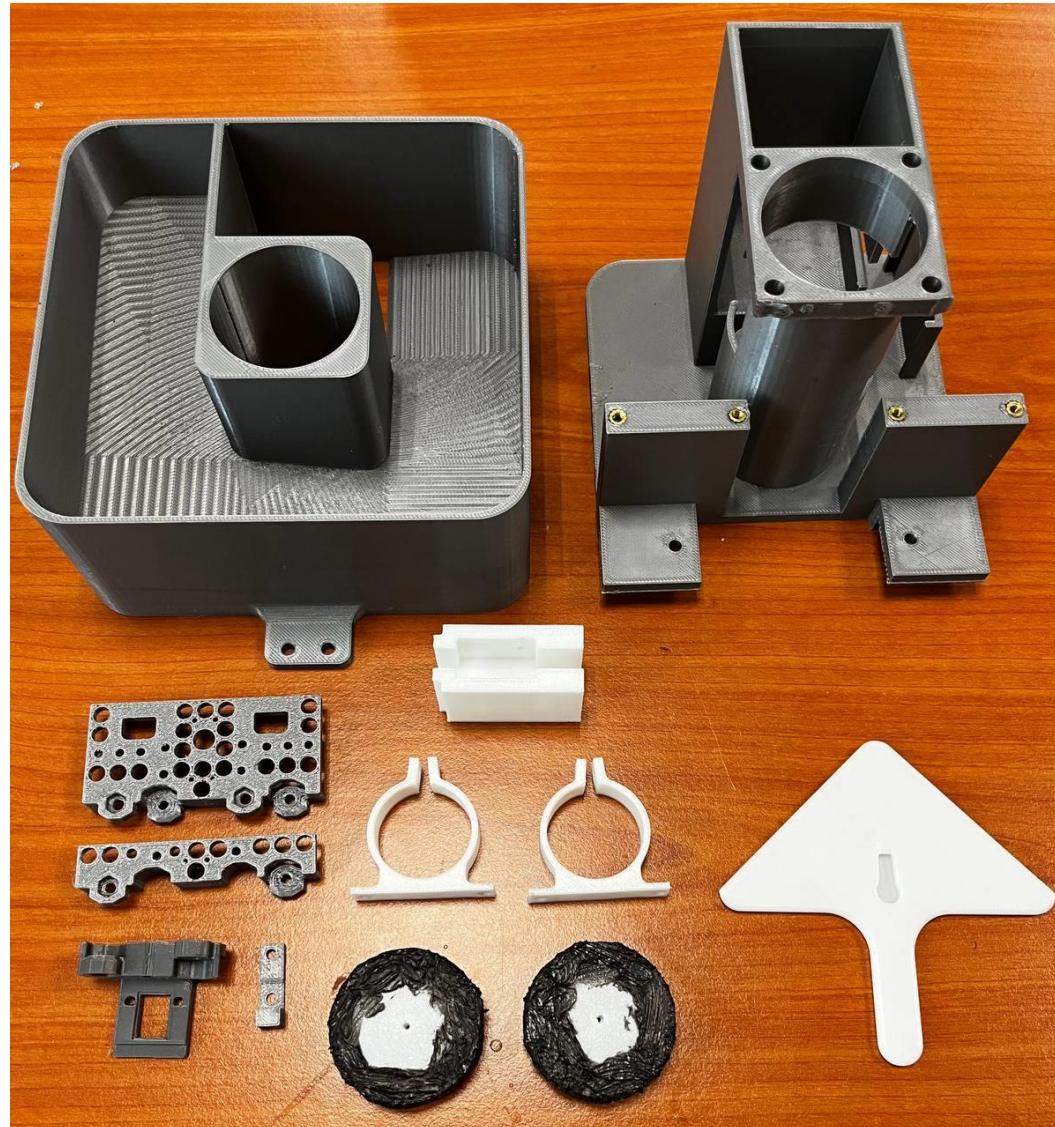


Motor secured within
the holder using an M3
Screw and Nut. TPU
allows the holder to
clamp down the motor



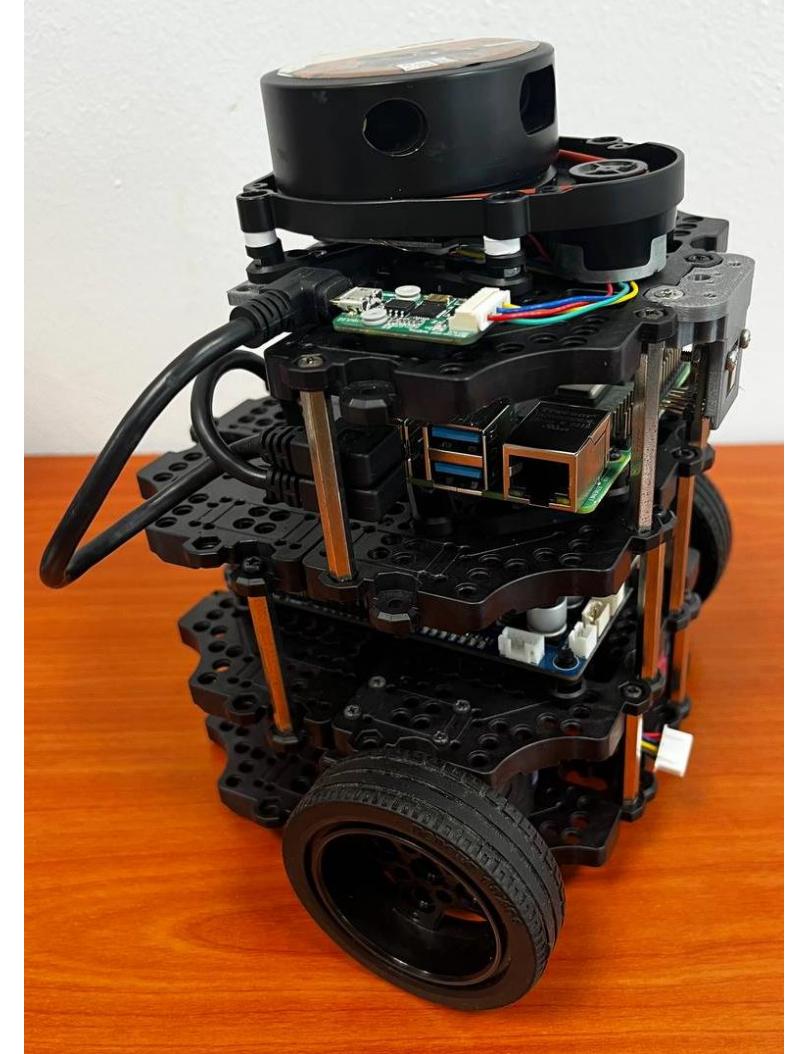
This adapter raises the
servo to its intended
position while the TPU
keeps the servo secure by
dampening vibrations

Fabrication Summary

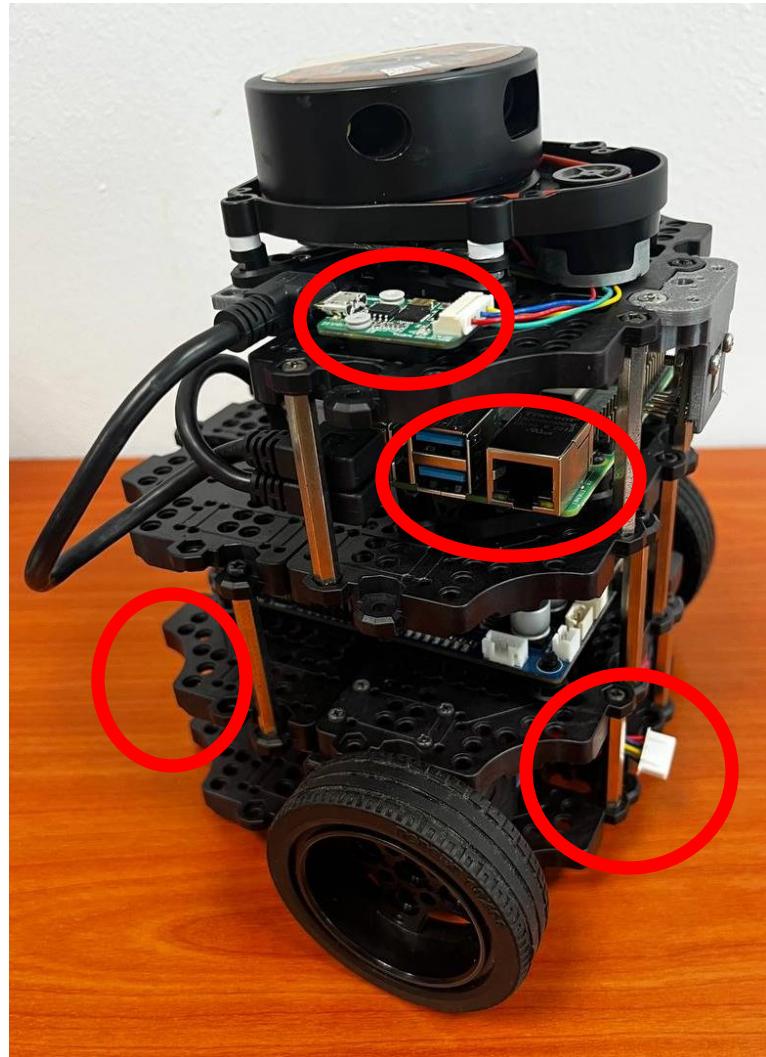


Assembly

Stage 1: Main Body



Stage 1: Main Body



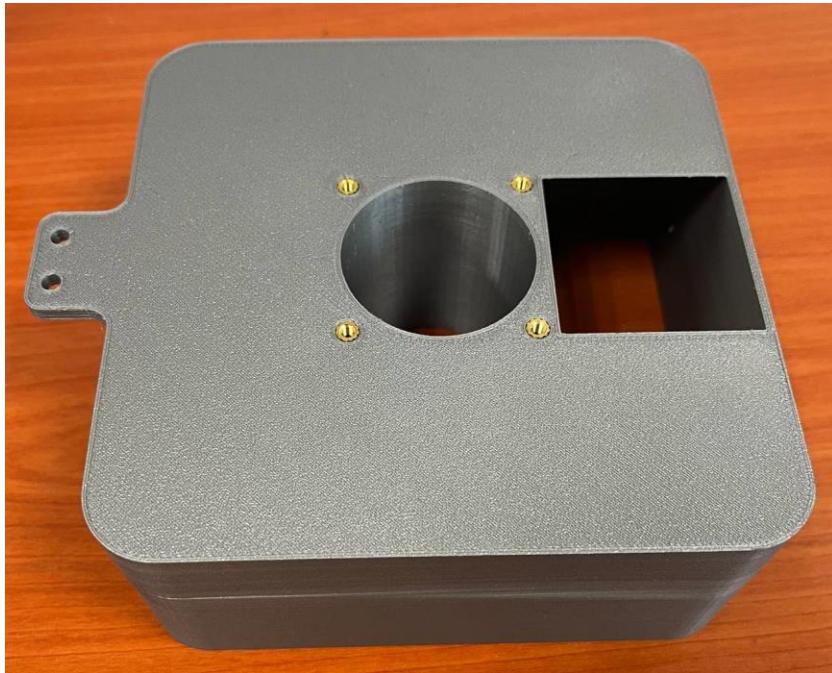
- Turn Battery 180 degree so that charging connection sticks out front
- Shift RPI onto other side of waffle plate and USB2LDS to Layer 4
- Remove Ball Caster

Stage 1: Main Body

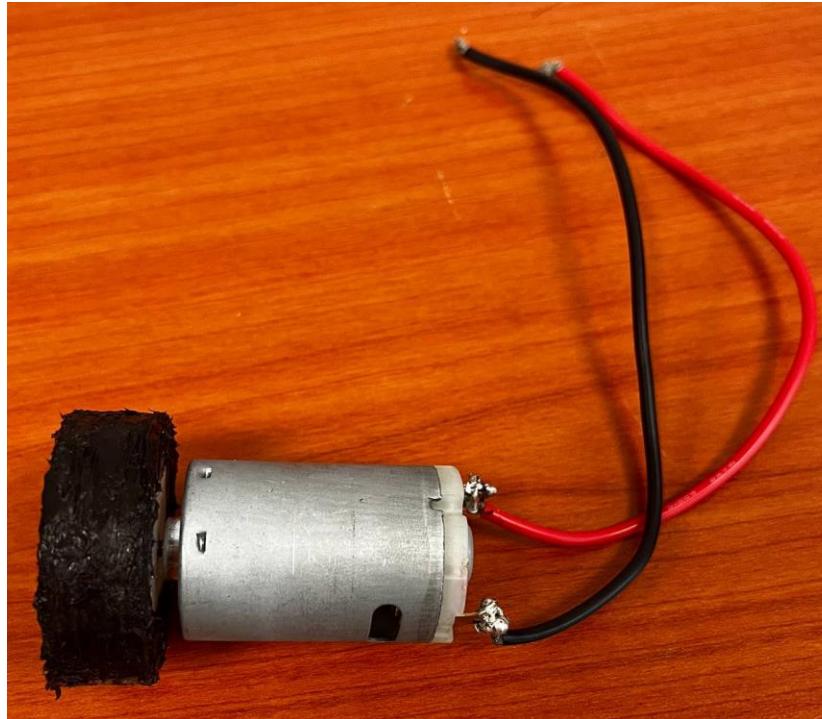


- Replace Layer 4's back waffle plate with Modified Waffle Plate
- Attach AMG8833 onto Layer 4 using AMG8833 mount
- Attach L298N Holder to Modified Waffle Plate and secure onto Layer 3
- Shift Plate Support back

Stage 2: Launching Mechanism



Add in
Heat Inserts

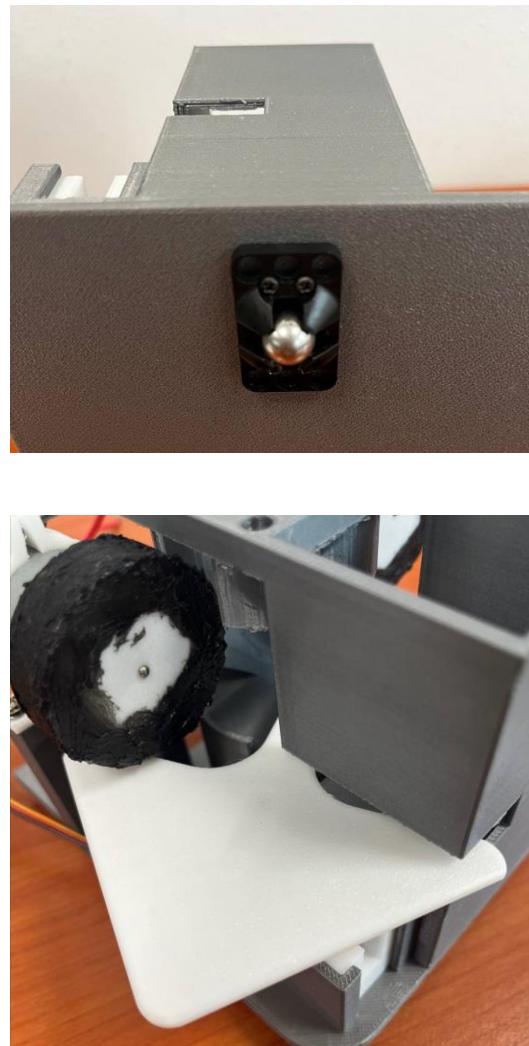
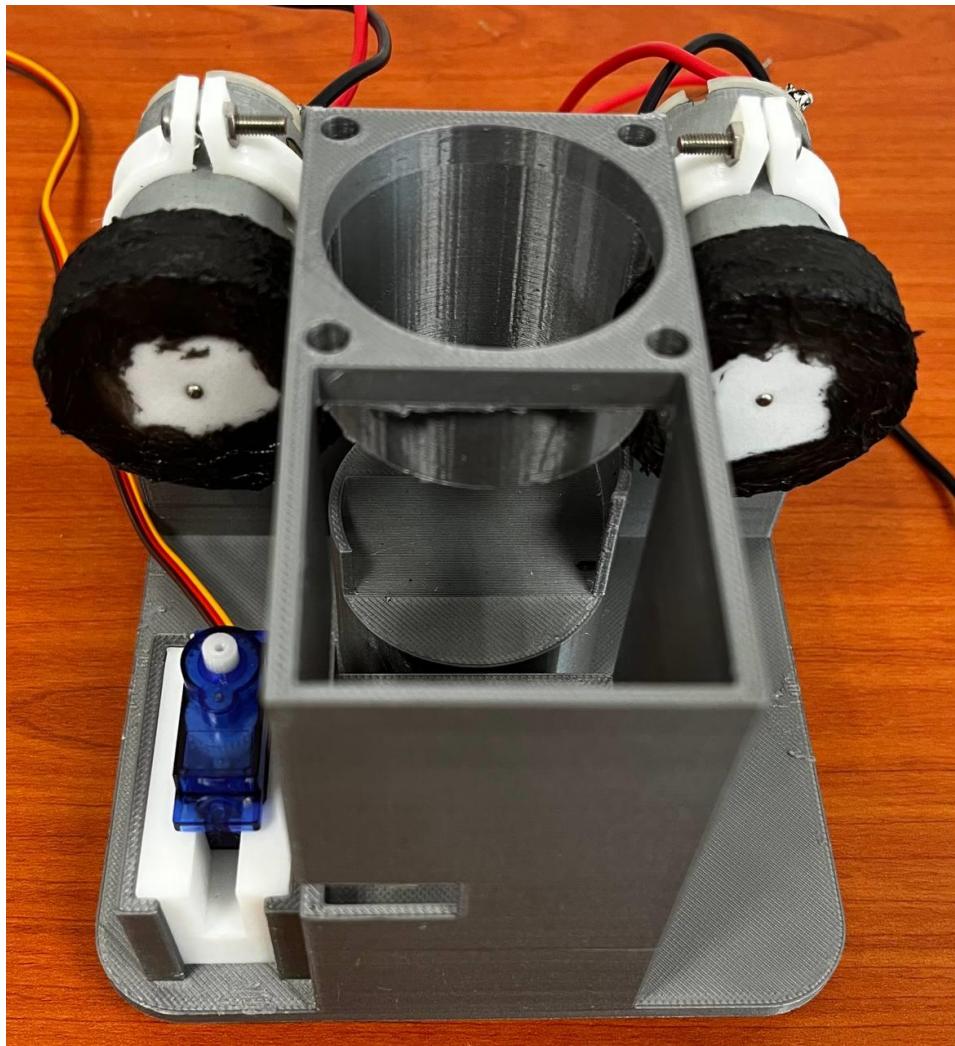


Solder wires onto motor
and attach flywheel
(silicone applied)



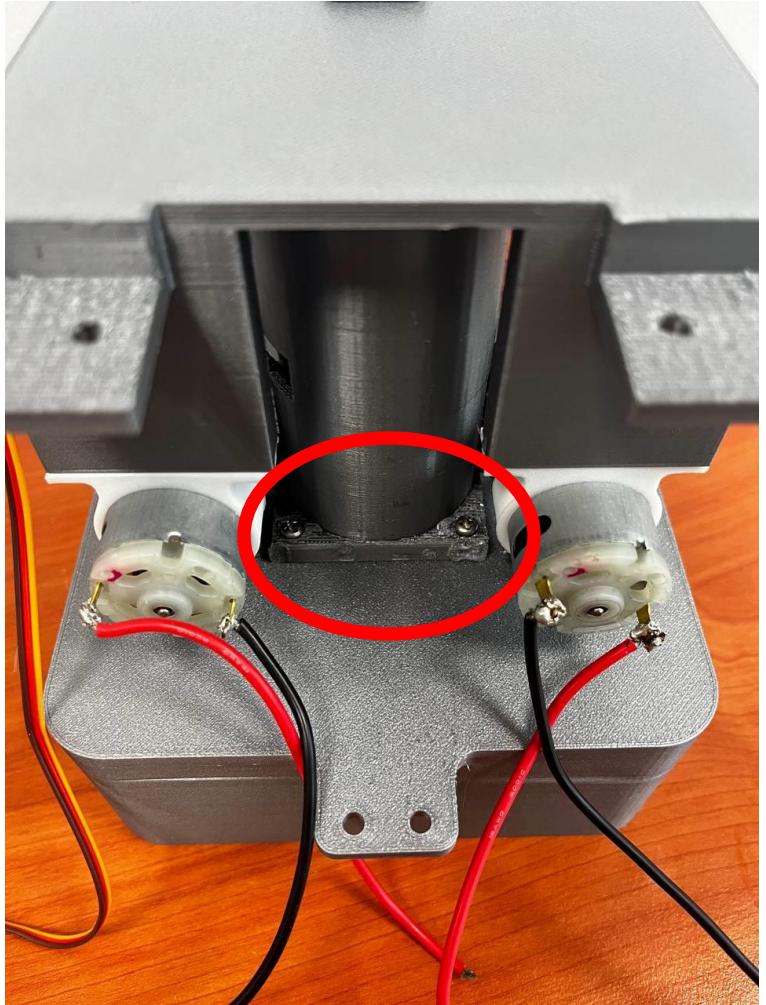
Attach
Motor Holders

Stage 2: Launching Mechanism



- Secure Motor and slot in servo (M3 Nut & Screw)
- Attach Ball Caster to base
- Attach Ball Feeder (adjustable during testing)

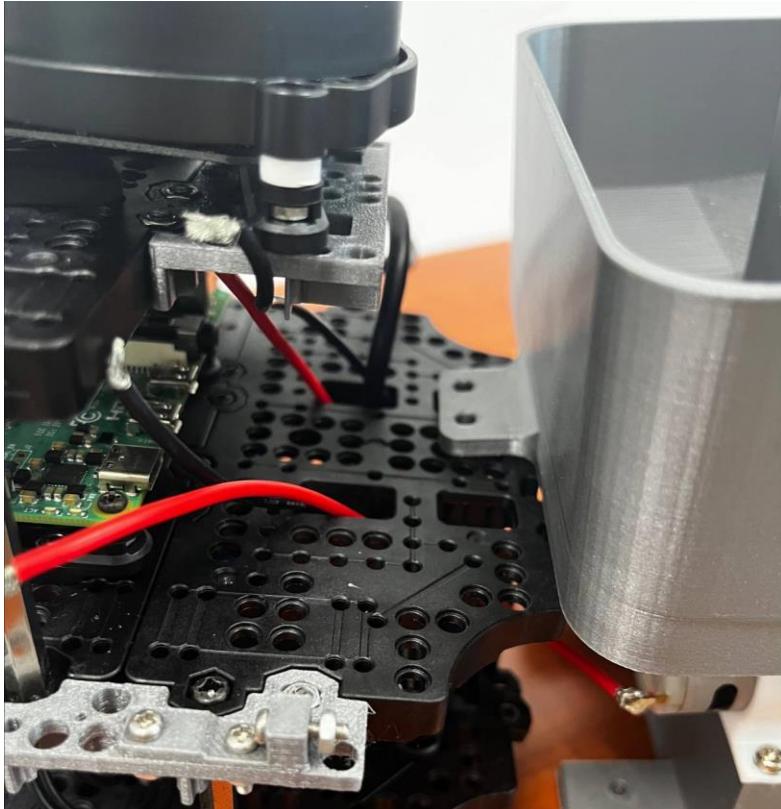
Stage 2: Launching Mechanism



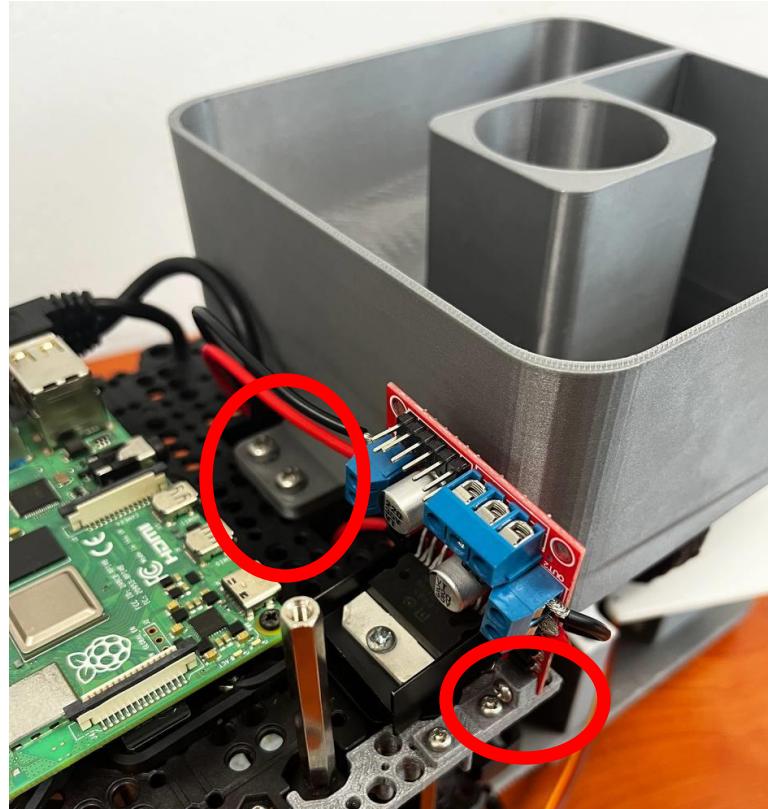
Secure Top
Half to Bottom
Half with 4 M3
Screw



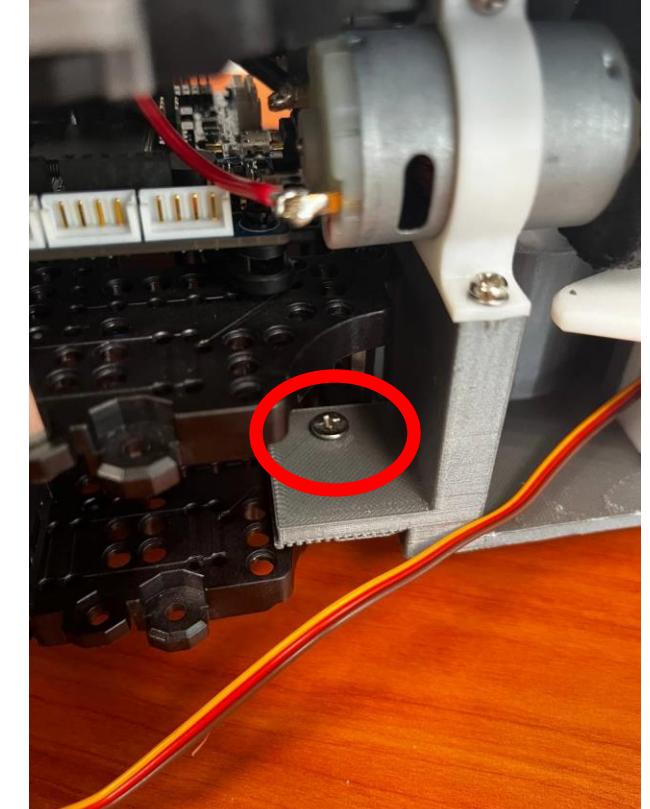
Stage 3: Full Assembly



Feed Motor wires
through holes as shown
(Consider temporary
detachment of Layer 4)

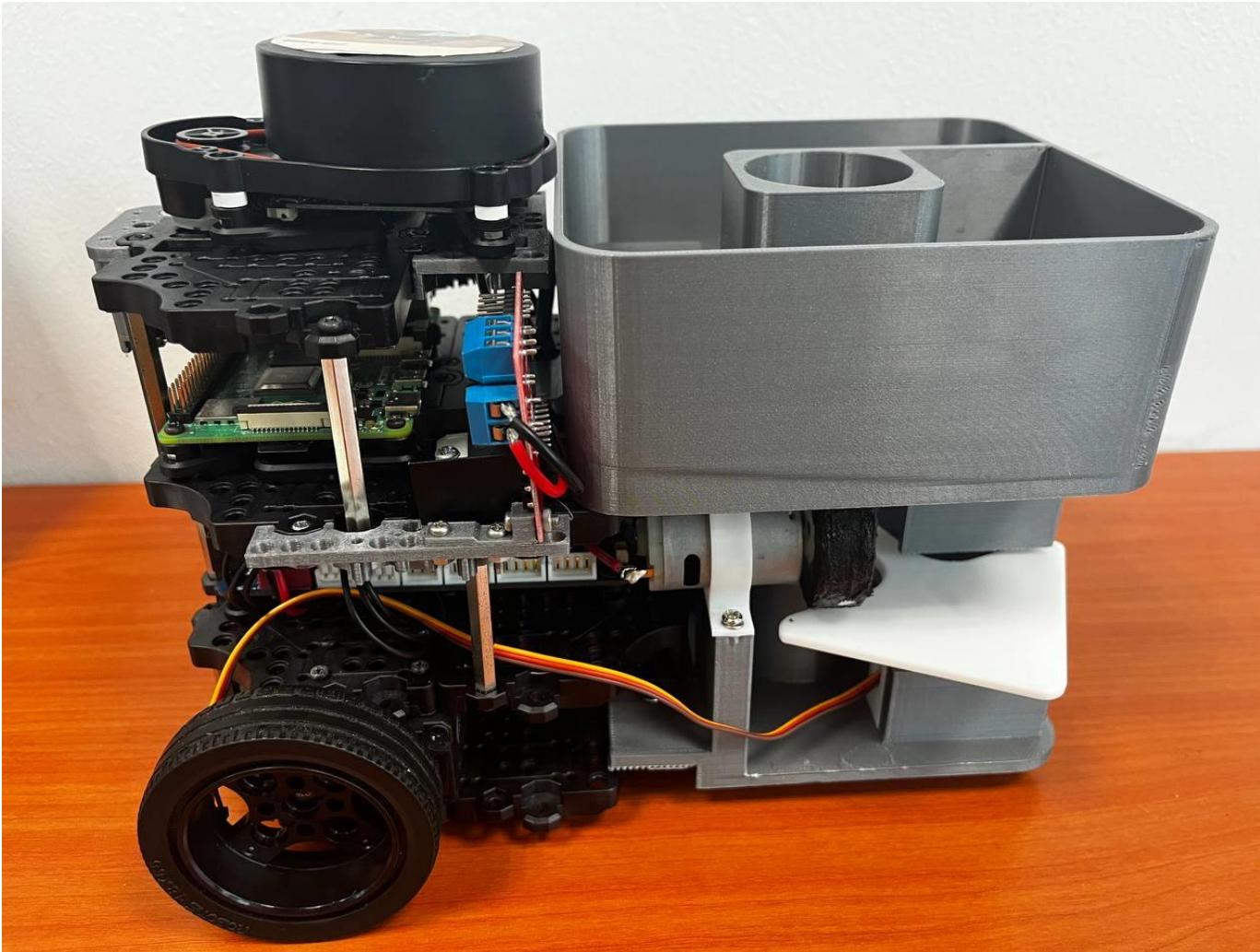


Secure L298N and
Attach launcher using 2
M4 Screws and Nuts



2 more M4
screws and Nuts
below

Assembly Completed



Annex

